

REMARKS

The Office Action dated February 14, 2006, has been carefully reviewed and the foregoing amendment and following remarks are made in consequence thereof.

Claims 1-31 are pending in this application. Claims 1-31 stand rejected.

The rejection of Claims 1, 14-17, 22, and 27-29 under 35 U.S.C. § 102(e) as being anticipated by Paulus et al. (U.S. Patent No. 6,399,951) "Paulus" is respectfully traversed.

Paulus describes a method for simultaneous transmission x-ray computed tomography (CT) and single photon emission tomography (SPECT) that includes rotating a cadmium zinc telluride (CZT) two-sided detector on an opposite side of a subject from an x-ray source, simultaneously detecting the position and energy of each pulsed x-ray and each emitted gamma-ray captured by the CZT detector, and creating CT and SPECT images from the recorded data.

Claim 1 recites a method for obtaining data including "scanning at least one of a head of a patient and a neck of the patient with a Multi-Energy Computed Tomography (MECT) system to acquire data including attenuations from Compton and photoelectric processes, the MECT including an x-ray source rotatable about the patient, the MECT configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect."

Paulus does not describe nor suggest a method for scanning a patient with a Multi-Energy Computed Tomography (MECT) system as recited in Claim 1. Specifically, Paulus does not describe nor suggest a Multi-Energy Computed Tomography system MECT configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect. Rather, in contrast to the present invention, Paulus describes a system that simultaneously acquires emission and transmission data using a CZT detector, but does not describe nor suggest a Multi-Energy Computed Tomography system MECT configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect. Accordingly, and for at least the reasons set forth above, Claim 1 is submitted to be patentable over Paulus.

Claims 14-17, 21, and 22 depend from independent Claim 1. When the recitations of Claims 14-17, 21, and 22 are considered in combination with the recitations of Claim 1,

Applicants submit that dependent Claims 14-17, 21, and 22 likewise are patentable over Paulus.

Claim 27 recites a Multi-Energy Computed Tomography (MECT) System configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect, the MECT including “a radiation source rotatable about a patient; a radiation detector; and a computer coupled to said radiation source and said radiation detector, said computer configured to: receive data regarding a first energy spectrum of a scan of at least one of a head of the patient and a neck of the patient; receive data regarding a second energy spectrum of the scan; and generate a location of a tagging ligand based upon the received data.”

Paulus does not describe nor suggest a Multi-Energy Computed Tomography (MECT) system as recited in Claim 27. Specifically, Paulus does not describe nor suggest a Multi-Energy Computed Tomography system configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect. Specifically, Paulus does not describe nor suggest a Multi-Energy Computed Tomography system MECT configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect. Rather, in contrast to the present invention, Paulus describes a system that simultaneously acquires emission and transmission data using a CZT detector, but does not describe nor suggest a Multi-Energy Computed Tomography system MECT configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect. Accordingly, and for at least the reasons set forth above, Claim 27 is submitted to be patentable over Paulus.

Claim 28 recites a Multi-Energy Computed Tomography (MECT) System configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect, the MECT including “a radiation source rotatable about a patient; a radiation detector; and a computer coupled to said radiation source and said radiation detector, said computer configured to: receive data regarding a first energy spectrum of a scan of at least one of a head of the patient and a neck of the patient; receive data regarding a second energy spectrum of the scan; and detect a labeled drug based upon the received data.”

Paulus does not describe nor suggest a Multi-Energy Computed Tomography (MECT) system as recited in Claim 28. Specifically, Paulus does not describe nor suggest a Multi-Energy Computed Tomography system configured to be responsive to different x-ray spectra

associated with Compton scatter and photoelectric effect. Rather, in contrast to the present invention, Paulus describes a system that simultaneously acquires emission and transmission data using a CZT detector, but does not describe nor suggest a Multi-Energy Computed Tomography system MECT configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect. Accordingly, and for at least the reasons set forth above, Claim 28 is submitted to be patentable over Paulus.

Claim 29 recites a Multi-Energy Computed Tomography (MECT) System configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect, the MECT including “a radiation source rotatable about a patient; a radiation detector; and a computer coupled to said radiation source and said radiation detector, said computer configured to: receive data regarding a first energy spectrum of a scan of a head of the patient; receive data regarding a second energy spectrum of the scan; generate a location of a tagged ligand with an affinity to a neurotransmitter released by a specific labeled drug's receptors based upon the received data; and detect a labeled drug based upon the received data to simultaneously monitor the labeled drug's distribution and a concentration of the neurotransmitter.”

Paulus does not describe nor suggest a Multi-Energy Computed Tomography (MECT) system as recited in Claim 29. Specifically, Paulus does not describe nor suggest a Multi-Energy Computed Tomography system configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect. Rather, in contrast to the present invention, Paulus describes a system that simultaneously acquires emission and transmission data using a CZT detector, but does not describe nor suggest a Multi-Energy Computed Tomography system MECT configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect. Accordingly, and for at least the reasons set forth above, Claim 29 is submitted to be patentable over Paulus.

For at least the reasons set forth above, Applicants respectfully request that the Section 102 rejection of Claims 1, 14-17, and 27-29 be withdrawn.

The rejection of Claims 3, 6, 18-20, and 31 under 35 U.S.C. § 103(a) as being unpatentable over Paulus et al. (U.S. Patent No. 6,399,951) “Paulus” in view of Carroll et al. (U.S. Patent No. 6,687,333) “Carroll” is respectfully traversed.

Paulus is described above. Carroll describes a system for generating tunable pulsed monochromatic X-rays that may be used to generate CT-like images using a rotating mosaic crystal "optic" time-of-flight "imaging," and phase contrast images. The system includes a tabletop laser emitting a light beam that is counter-propagated against an electron beam produced by a linear accelerator. X-ray photon pulses are generated by inverse Compton scattering that occurs as a consequence of the "collision" that occurs between the electron beam and IR photons generated by the laser.

Applicants respectfully submit that the Section 103 rejection of the presently pending claims is not a proper rejection. As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levengood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion nor motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

Furthermore, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention. Specifically, Carroll is cited for describing the use of a CT based system for computing blood flow, performing a Compton and photoelectric decomposition of the data, acquiring data regarding a targeting of a tumor, and classifying tissue as cancerous or non-cancerous. Applicants respectfully submit it is not obvious to combine a tabletop laser and a linear accelerator into a device that rotates the source of x-rays and the detector about a patient. There has to be a possibility of success shown in the cited art. Since there is no teaching nor suggestion in the cited art for the combination or the possibility of success when combining the art, the Section 103 rejection appears to be based on a hindsight

reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicants request that the Section 103 rejection be withdrawn.

If art “teaches away” from a claimed invention, such a teaching supports the nonobviousness of the invention. U.S. v. Adams, 148 USPQ 479 (1966); Gillette Co. v. S.C. Johnson & Son, Inc., 16 USPQ2d 1923, 1927 (Fed. Cir. 1990). In light of this standard, it is respectfully submitted that the cited art, as a whole, is not suggestive of the presently claimed invention. More specifically, Applicants respectfully submit that Paulus and Carroll teach away from each other and the present invention. Paulus describes a system that simultaneously acquires emission and transmission data using a CZT detector and Carroll describes a system for generating tunable pulsed monochromatic X-rays. Applicants respectfully submit it would not be obvious to use a method for generating tunable pulsed monochromatic X-rays with a system that simultaneously acquires emission and transmission data using a CZT detector. Accordingly, Applicants submit Paulus and Carroll teach away from each other and the present invention.

Moreover, neither Paulus or Carroll, considered alone or in combination, describe or suggest the claimed invention. Specifically, Claim 1 recites a method for obtaining data including “scanning at least one of a head of a patient and a neck of the patient with a Multi-Energy Computed Tomography (MECT) system to acquire data including attenuations from Compton and photoelectric processes, the MECT including an x-ray source rotatable about the patient, the MECT configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect.”

Neither Paulus nor Carroll, considered alone or in combination, describe or suggest a method for scanning a patient with a Multi-Energy Computed Tomography (MECT) system as recited in Claim 1. Specifically, no combination of Paulus or Carroll, describes or suggests a Multi-Energy Computed Tomography system configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect.” Rather, in contrast to the present invention, Paulus describes a system that simultaneously acquires emission and transmission data using a CZT detector and Carroll describes a system including a tabletop laser and a linear accelerator with a photocathode injector and RF accelerator and gun and a beam alignment sub-system positioned at a laser beam-electron beam interaction zone that directs the X-ray beam through a beryllium window and onto

mosaic crystals. Accordingly, and for at least the reasons set forth above, Claim 1 is submitted to be patentable over Paulus in view of Carroll.

Claims 3, 6, 18-20 depend from independent Claim 1. When the recitations of Claims 3, 6, 18-20 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claims 3, 6, 18-20 likewise is patentable over Paulus in view of Carroll.

Claim 31 recites a Multi-Energy Computed Tomography (MECT) System configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect, the MECT including “a radiation source rotatable about a patient; a radiation detector; and a computer coupled to said radiation source and said radiation detector, said computer configured to: receive data regarding a first energy spectrum of a scan of a head of the patient; receive data regarding a second energy spectrum of the scan; and classify tissue as cancerous and non-cancerous based upon the received data.”

Neither Paulus nor Carroll, considered alone or in combination, describe or suggest a Multi-Energy Computed Tomography (MECT) system as recited in Claim 31. Specifically, neither Paulus nor Carroll, considered alone or in combination, describe or suggest a Multi-Energy Computed Tomography system configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect. Rather, in contrast to the present invention, Paulus describes a system that simultaneously acquires emission and transmission data using a CZT detector and Carroll describes a system including a tabletop laser and a linear accelerator with a photocathode injector and RF accelerator and gun and a beam alignment sub-system positioned at a laser beam-electron beam interaction zone that directs the X-ray beam through a beryllium window and onto mosaic crystals. Accordingly, and for at least the reasons set forth above, Claim 31 is submitted to be patentable over Paulus in view of Carroll

For the reasons set forth above, Applicants request that the Section 103 rejection of Claims 3, 6, 18-20, and 31 be withdrawn.

The rejection of Claims 7-12 and 30 under 35 U.S.C. § 103(a) as being unpatentable over Paulus et al. (U.S. Patent No. 6,399,951) “Paulus” in view of Fessler (U.S. Patent No. 6,754,298) is respectfully traversed.

Paulus is described above. Fessler describes a reconstruction method for a polyenergetic scan wherein both the spatial and energy dependencies are parameterized using basis functions that do not require separability in the spatial and energy dimensions and yields a system of equations in the line integrals through the spatial basis functions. The equations are solved numerically in sinogram space, and FBP reconstruction is performed to form images of the material components.

Applicants respectfully submit that the Section 103 rejection of the presently pending claims is not a proper rejection. As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levengood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion nor motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

Furthermore, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention. Specifically, Paulus is cited for describing a system that simultaneously acquires emission and transmission data using a CZT detector and Fessler is merely cited for its teaching of a multi-energy CT system to acquire data and perform a Basis Material Decomposition (BMD) of the acquired data. Since there is no teaching or suggestion in the cited art for the combination, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicants request that the Section 103 rejection be withdrawn.

If art “teaches away” from a claimed invention, such a teaching supports the nonobviousness of the invention. U.S. v. Adams, 148 USPQ 479 (1966); Gillette Co. v. S.C. Johnson & Son, Inc., 16 USPQ2d 1923, 1927 (Fed. Cir. 1990). In light of this standard, it is respectfully submitted that the cited art, as a whole, is not suggestive of the presently claimed invention. More specifically, Applicants respectfully submit that Paulus and Fessler teach away from each other and the present invention. Paulus describes a system that simultaneously acquires emission and transmission data using a CZT detector and Fessler describes a method for statistically reconstructing images from a plurality of transmission measurements having energy diversity i.e., a set of two or more energy spectra. Applicants respectfully submit it would not be obvious to use a method for reconstructing images from transmission measurements having energy diversity with a system that simultaneously acquires emission and transmission data using a CZT detector. Accordingly, Applicants submit Paulus and Fessler teach away from each other and the present invention.

Moreover, neither Paulus nor Fessler, considered alone or in combination, describe or suggest the claimed invention. Specifically, Claim 1 recites a method for obtaining data including “scanning at least one of a head of a patient and a neck of the patient with a Multi-Energy Computed Tomography (MECT) system to acquire data including attenuations from Compton and photoelectric processes, the MECT including an x-ray source rotatable about the patient, the MECT configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect.”

Neither Paulus nor Fessler, considered alone or in combination, describe or suggest a method for scanning a patient with a Multi-Energy Computed Tomography (MECT) system as recited in Claim 1. Specifically, neither Paulus nor Fessler, considered alone or in combination, describe or suggest a Multi-Energy Computed Tomography system MECT configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect. Rather, in contrast to the present invention, Paulus describes a system that simultaneously acquires emission and transmission data using a CZT detector and Fessler describes a method for statistically reconstructing images from a plurality of transmission measurements having energy diversity. Accordingly, and for at least the reasons set forth above, Claim 1 is submitted to be patentable over Paulus in view of Fessler.

Claims 7-12 depend from independent Claim 1. When the recitations of Claims 7-12 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claims 7-12 likewise is patentable over Paulus in view of Fessler.

Claim 30 recites a Multi-Energy Computed Tomography (MECT) System configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect, the MECT including “a radiation source rotatable about a patient; a radiation detector; and a computer coupled to said radiation source and said radiation detector, said computer configured to: receive data regarding a first energy spectrum of a scan of a head of the patient; receive data regarding a second energy spectrum of the scan; and perform a Basis Material Decomposition (BMD) of the received data to characterize a plaque in a carotid artery.”

No combination of Paulus and Fessler describes or suggests the combination recited in Claim 30. Specifically, Applicant respectfully submits that no combination of Carroll and Fessler describes or suggests a multi-energy computed tomography system configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect. Rather, in contrast to the present invention, Paulus describes a system that simultaneously acquires emission and transmission data using a CZT detector and Fessler describes a method for statistically reconstructing images from a plurality of transmission measurements having energy diversity. Accordingly, and for at least the reasons set forth above, Claim 30 is submitted as patentable over Paulus in view of Fessler.

For the reasons set forth above, Applicants request that the Section 103 rejection of Claims 7-12 and 30 be withdrawn.

The rejection of Claim 13 under 35 U.S.C. § 103(a) as being unpatentable over Paulus et al. (U.S. Patent No. 6,399,951) “Paulus” in view of Leuchter et al. (U.S. Patent No. 5,269,315) “Leuchter” is respectfully traversed.

Paulus is described above. Leuchter describes a method of analyzing electroencephalographic information to assess brain lesions, characterize afflictions such as dementia, Alzheimer's disease, Pick's disease and demyelinating diseases such as multiple sclerosis using a determination of the electrical output of a brain region by obtaining first data representative of energy in the brain region in a primary frequency domain and determining

second data representative of energy in the primary frequency domain relative to the energy in a secondary frequency domain.

Applicants respectfully submit that the Section 103 rejection of the presently pending claims is not a proper rejection. As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levengood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion nor motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

Furthermore, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention. Specifically, Paulus is cited for describing a system that simultaneously acquires emission and transmission data using a CZT detector and Leuchter is cited for obtaining information pertaining to brain lesions and diseases such as mild dementia and Alzheimer's disease. Leuchter determines brain lesions by quantified electroencephalography and does not describe or suggest using a multi-energy computed tomography system to acquire the data. Since there is no teaching or suggestion in the cited art for the combination, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicants request that the Section 103 rejection be withdrawn.

If art "teaches away" from a claimed invention, such a teaching supports the nonobviousness of the invention. U.S. v. Adams, 148 USPQ 479 (1966); Gillette Co. v. S.C. Johnson & Son, Inc., 16 USPQ2d 1923, 1927 (Fed. Cir. 1990). In light of this standard, it is

respectfully submitted that the cited art, as a whole, is not suggestive of the presently claimed invention. More specifically, Applicants respectfully submit that Paulus and Leuchter teach away from each other and the present invention. Paulus describes a system that simultaneously acquires emission and transmission data using a CZT detector and Leuchter determines brain lesions by quantified electroencephalography, which is not an imaging system and does not use an x-ray source or an x-ray detector. Accordingly, Applicants submit Paulus and Leuchter teach away from each other and the present invention.

Moreover, neither Paulus nor Leuchter, considered alone or in combination, describe or suggest the claimed invention. Specifically, Claim 1 recites a method for obtaining data including “scanning at least one of a head of a patient and a neck of the patient with a Multi-Energy Computed Tomography (MECT) system to acquire data including attenuations from Compton and photoelectric processes, the MECT including an x-ray source rotatable about the patient, the MECT configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect.”

Neither Paulus nor Leuchter, considered alone or in combination, describe or suggest a method for scanning a patient with a Multi-Energy Computed Tomography (MECT) system as recited in Claim 1. Specifically, neither Paulus nor Leuchter, describes or suggests a Multi-Energy Computed Tomography system configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect. Rather, in contrast to the present invention, Paulus describes a system that simultaneously acquires emission and transmission data using a CZT detector and Leuchter describes determining brain lesions by quantified electroencephalography. Accordingly, and for at least the reasons set forth above, Claim 1 is submitted to be patentable over Paulus in view of Leuchter.

Claim 13 depends from independent Claim 1. When the recitations of Claim 13 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claim 13 likewise is patentable over Paulus in view of Leuchter.

For the reasons set forth above, Applicants request that the Section 103 rejection of Claim 13 be withdrawn.

The rejection of Claims 2, 4, 5, 23, and 24 under 35 U.S.C. § 103(a) as being unpatentable over Paulus et al. (U.S. Patent No. 6,399,951) “Paulus” in view of Carroll et al.

(U.S. Patent No. 6,687,333) “Carroll” and further in view of Wintermark et al. (U.S. Patent No. 6,792,302) “Wintermark” is respectfully traversed.

Paulus and Carroll are described above. Wintermark describes a method of obtaining measurements of the cerebral blood flow and cerebral blood volume of the brain of a stroke patient using perfusion CT for quantitative assessment of cerebral blood flow (CBF), mean transit time (MMT) and cerebral blood volume (CBV) of brain tissue to determine if a stroke patient is a candidate for thrombolysis therapy.

Applicants respectfully submit that the Section 103 rejection of the presently pending claims is not a proper rejection. As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levengood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion nor motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

Furthermore, it is impermissible to use the claimed invention as an instruction manual or “template” to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention. Specifically, Paulus is cited for describing a system that simultaneously acquires emission and transmission data using a CZT detector, Carroll is cited for describing the use of a multi-energy CT system to obtain information pertaining to cerebral blood flow, and Wintermark is merely cited for its teaching of a perfusion CT system to determine cerebral blood flow (CBF) and mean transit time. Since there is no teaching nor suggestion in the cited art for the combination, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an

attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicants request that the Section 103 rejection be withdrawn.

If art “teaches away” from a claimed invention, such a teaching supports the nonobviousness of the invention. U.S. v. Adams, 148 USPQ 479 (1966); Gillette Co. v. S.C. Johnson & Son, Inc., 16 USPQ2d 1923, 1927 (Fed. Cir. 1990). In light of this standard, it is respectfully submitted that the cited art, as a whole, is not suggestive of the presently claimed invention. More specifically, Applicants respectfully submit that Paulus, Carroll and Wintermark teach away from each other and the present invention. Paulus describes a system that simultaneously acquires emission and transmission data using a CZT detector Carroll describes a system for generating tunable pulsed monochromatic X-rays and Wintermark describes a method for determining cerebral blood flow (CBF), mean transit time (MMT) and cerebral blood volume (CBV) of brain tissue using perfusion CT. Applicants respectfully submit it would not be obvious to use a perfusion CT system with a system that generates tunable pulsed monochromatic X-rays, and a system that simultaneously acquires emission and transmission data using a CZT detector. Accordingly, Applicants submit Paulus, Carroll and Wintermark teach away from each other and from the present invention.

Moreover, none of Paulus, Carroll or Wintermark, considered alone or in combination, describe or suggest the claimed invention. Specifically, Claim 1 recites a method for obtaining data, said method comprising scanning at least one of a head of a patient and a neck of the patient with a Multi-Energy Computed Tomography (MECT) system to acquire data including attenuations from Compton and photoelectric processes, the MECT including an x-ray source rotatable about the patient, the MECT configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect.”

None of Paulus, Carroll or Wintermark, considered alone or in combination, describe or suggest a method for scanning a patient with a Multi-Energy Computed Tomography (MECT) system as recited in Claim 1. Specifically, no combination of Paulus, Carroll or Wintermark, describes or suggests a Multi-Energy Computed Tomography system configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect. Rather, in contrast to the present invention, Paulus describes a system that simultaneously acquires emission and transmission data using a CZT detector, Carroll describes a system including a tabletop laser and a linear accelerator with a photocathode

injector and RF accelerator and gun and a beam alignment sub-system positioned at a laser beam-electron beam interaction zone that directs the X-ray beam through a beryllium window and onto mosaic crystals, and Wintermark describes using perfusion CT for quantitative assessment of cerebral blood flow (CBF), mean transit time (MMT) and cerebral blood volume (CBV) of brain tissue. Accordingly, and for at least the reasons set forth above, Claim 1 is submitted to be patentable over Paulus in view of Carroll and further in view of Wintermark.

Claims 2, 4, and 5 depend from independent Claim 1. When the recitations of Claims 2, 4, and 5 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claims 2, 4, and 5 likewise is patentable over Paulus in view of Carroll and further in view of Wintermark.

Claim 23 recites a Multi-Energy Computed Tomography (MECT) System configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect, the MECT including “a radiation source_rotatable about a patient; a radiation detector; and a computer coupled to said radiation source and said radiation detector, said computer configured to: receive data regarding a first energy spectrum of a scan of a head of the patient; receive data regarding a second energy spectrum of a scan of the head; generate an image of at least one of a cerebral blood volume of the patient and a cerebral blood flow of the patient; and calculate a mean transit time of the cerebral blood flow based on the received data.”

None of Paulus, Carroll or Wintermark, considered alone or in combination, describe or suggest a method for scanning a patient with a Multi-Energy Computed Tomography (MECT) system as recited in Claim 23. Specifically, none of Paulus, Carroll or Wintermark, describes or suggests a Multi-Energy Computed Tomography system configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect. Rather, in contrast to the present invention, Paulus describes a system that simultaneously acquires emission and transmission data using a CZT detector, Carroll describes a system including a tabletop laser and a linear accelerator with a photocathode injector and RF accelerator and gun and a beam alignment sub-system positioned at a laser beam-electron beam interaction zone that directs the X-ray beam through a beryllium window and onto mosaic crystals, and Wintermark describes using perfusion CT for quantitative assessment of cerebral blood flow (CBF), mean transit time (MMT) and cerebral blood volume (CBV) of

brain tissue. Accordingly, and for at least the reasons set forth above, Claim 23 is submitted to be patentable over Paulus in view of Carroll and further in view of Wintermark.

Claim 24 depends from independent Claim 23. When the recitations of Claim 24 are considered in combination with the recitations of Claim 23, Applicants submit that dependent Claim 24 likewise is patentable over Paulus in view of Carroll and further in view of Wintermark.

For the reasons set forth above, Applicants request that the Section 103 rejection of Claims 2, 4, 5, 23, and 24 be withdrawn.

The rejection of Claim 25 under 35 U.S.C. § 103(a) as being unpatentable over Paulus et al. (U.S. Patent No. 6,399,951) "Paulus" in view of Carroll et al. (U.S. Patent No. 6,687,333) "Carroll" in view of Wintermark et al. (U.S. Patent No. 6,792,302) "Wintermark" and further in view of Fessler (U.S. Patent No. 6,754,298) is respectfully traversed.

Paulus, Carroll, Wintermark, and Fessler are described above.

Applicants respectfully submit that the Section 103 rejection of the presently pending claims is not a proper rejection. As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levensgood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion nor motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

Furthermore, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is based on a combination of teachings selected from multiple patents in an attempt to arrive

at the claimed invention. Specifically, Paulus is cited for describing a system that simultaneously acquires emission and transmission data using a CZT detector, Carroll is cited for describing the use of a multi-energy CT system to obtain information pertaining to cerebral blood flow, Wintermark is cited for its teaching of a perfusion CT system to determine cerebral blood flow (CBF) and mean transit time, and Fessler is cited for its teaching of a multi-energy CT system to acquire data and perform a Basis Material Decomposition (BMD) of the acquired data. Since there is no teaching nor suggestion in the cited art for the combination, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicants request that the Section 103 rejection be withdrawn.

If art “teaches away” from a claimed invention, such a teaching supports the nonobviousness of the invention. U.S. v. Adams, 148 USPQ 479 (1966); Gillette Co. v. S.C. Johnson & Son, Inc., 16 USPQ2d 1923, 1927 (Fed. Cir. 1990). In light of this standard, it is respectfully submitted that the cited art, as a whole, is not suggestive of the presently claimed invention. More specifically, Applicants respectfully submit that Carroll and Wintermark teach away from each other and the present invention. Carroll describes a system for generating tunable pulsed monochromatic X-rays, Wintermark describes a method for determining cerebral blood flow (CBF), mean transit time (MTT) and cerebral blood volume (CBV) of brain tissue using perfusion CT, and Fessler describes a method for statistically reconstructing images from a plurality of transmission measurements having energy diversity i.e., a set of two or more energy spectra. Applicants respectfully submit it would not be obvious to use a method for reconstructing images from transmission measurements having energy diversity with a system that generates tunable pulsed monochromatic X-rays and would not be obvious to use a system including a tabletop laser and a linear accelerator with a photocathode injector and RF accelerator and gun and a beam alignment sub-system that directs the X-ray beam through a beryllium window and onto mosaic crystals to perform a perfusion CT scan. Accordingly, Applicants submit Carroll teaches away from Wintermark, Fessler, and the present invention.

Moreover, none of Paulus, Carroll, Wintermark, and Fessler considered alone or in combination, describe or suggest the claimed invention. Specifically, Claim 23 recites a Multi-Energy Computed Tomography (MECT) System configured to be responsive to

different x-ray spectra associated with Compton scatter and photoelectric effect, the MECT including “a radiation source_rotatable about a patient; a radiation detector; and a computer coupled to said radiation source and said radiation detector, said computer configured to: receive data regarding a first energy spectrum of a scan of a head of the patient; receive data regarding a second energy spectrum of a scan of the head; generate an image of at least one of a cerebral blood volume of the patient and a cerebral blood flow of the patient; and calculate a mean transit time of the cerebral blood flow based on the received data.”

None of Carroll, Wintermark, and Fessler, considered alone or in combination, describe or suggest a method for scanning a patient with a Multi-Energy Computed Tomography (MECT) system as recited in Claim 23. Specifically, no combination of Carroll, Wintermark, and Fessler, describes or suggests a Multi-Energy Computed Tomography system configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect. Rather, in contrast to the present invention, Paulus describes a system that simultaneously acquires emission and transmission data using a CZT detector, Carroll describes a system including a tabletop laser and a linear accelerator with a photocathode injector and RF accelerator and gun and a beam alignment sub-system positioned at a laser beam-electron beam interaction zone that directs the X-ray beam through a beryllium window and onto mosaic crystals, Wintermark describes using perfusion CT for quantitative assessment of cerebral blood flow (CBF), mean transit time (MMT) and cerebral blood volume (CBV) of brain tissue, and Fessler describes a method for statistically reconstructing images from a plurality of transmission measurements having energy diversity. Accordingly, for at least the reasons set forth above, Claim 23 is submitted to be patentable over Paulus in view of Carroll in view of Wintermark and further in view of Fessler.

Claim 25 depends from independent Claim 23. When the recitations of Claim 25 are considered in combination with the recitations of Claim 23, Applicants submit that dependent Claim 25 likewise is patentable over Paulus in view of Carroll in view of Wintermark and further in view of Fessler.

For the reasons set forth above, Applicants request that the Section 103 rejection of Claim 25 be withdrawn.

The rejection of Claim 26 under 35 U.S.C. § 103(a) as being unpatentable over Paulus et al. (U.S. Patent No. 6,399,951) “Paulus” in view of Carroll et al. (U.S. Patent No. 6,687,333) “Carroll” in view of Wintermark et al. (U.S. Patent No. 6,792,302) “Wintermark” and further in view of Leuchter et al. (U.S. Patent No. 5,269,315) “Leuchter” is respectfully traversed.

Paulus, Carroll, Wintermark, and Leuchter are described above.

Applicants respectfully submit that the Section 103 rejection of the presently pending claims is not a proper rejection. As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levengood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion nor motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

Furthermore, it is impermissible to use the claimed invention as an instruction manual or “template” to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention. Specifically, Carroll is cited for describing the use of a multi-energy CT system to obtain information pertaining to cerebral blood flow, Wintermark is cited for its teaching of a perfusion CT system to determine cerebral blood flow (CBF) and mean transit time, and Leuchter is cited for obtaining information pertaining to brain lesions and diseases such as mild dementia and Alzheimer's Disease. Leuchter determines brain lesions by quantified electroencephalography and does not describe or suggest using a multi-energy computed tomography system to acquire the data. Since there is no teaching nor suggestion in the cited art for the combination, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an

attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicants request that the Section 103 rejection be withdrawn.

If art “teaches away” from a claimed invention, such a teaching supports the nonobviousness of the invention. U.S. v. Adams, 148 USPQ 479 (1966); Gillette Co. v. S.C. Johnson & Son, Inc., 16 USPQ2d 1923, 1927 (Fed. Cir. 1990). In light of this standard, it is respectfully submitted that the cited art, as a whole, is not suggestive of the presently claimed invention. More specifically, Applicants respectfully submit that Carroll and Wintermark teach away from each other and the present invention. Carroll describes a system for generating tunable pulsed monochromatic X-rays, Wintermark describes a method for determining cerebral blood flow (CBF), mean transit time (MMT) and cerebral blood volume (CBV) of brain tissue using perfusion CT, and Leuchter determines brain lesions by quantified electroencephalography and does not describe or suggest using a multi-energy computed tomography system to acquire the data. Applicants respectfully submit it would not be obvious to use a method for reconstructing images from transmission measurements having energy diversity with a system that generates tunable pulsed monochromatic X-rays and would not be obvious to use a system including a tabletop laser and a linear accelerator with a photocathode injector and RF accelerator and gun and a beam alignment sub-system that directs the X-ray beam through a beryllium window and onto mosaic crystals to perform a perfusion CT scan. Moreover, Leuchter determines brain lesions by quantified electroencephalography, which is not an imaging system and does not use an x-ray source or an x-ray detector. Accordingly, Applicants submit that Paulus and Carroll teach away from Wintermark, Leuchter, and the present invention.

Moreover, none of Paulus Carroll, Wintermark, and Leuchter considered alone or in combination, describe or suggest the claimed invention. Specifically, Claim 23 recites a Multi-Energy Computed Tomography (MECT) System configured to be responsive to different x-ray spectra associated with Compton scatter and photoelectric effect, the MECT including “a radiation source_rotatable about a patient; a radiation detector; and a computer coupled to said radiation source and said radiation detector, said computer configured to: receive data regarding a first energy spectrum of a scan of a head of the patient; receive data regarding a second energy spectrum of a scan of the head; generate an image of at least one of a cerebral blood volume of the patient and a cerebral blood flow of the patient; and calculate a mean transit time of the cerebral blood flow based on the received data.”


None of Paulus, Carroll, Wintermark, and Leuchter, considered alone or in combination, describe or suggest a method for scanning a patient with a Multi-Energy Computed Tomography (MECT) system as recited in Claim 23. Specifically, no combination of Carroll, Wintermark, Fessler, and Leuchter, describes or suggests a Multi-Energy Computed Tomography system including an x-ray source rotatable about the patient. Rather, in contrast to the present invention, Paulus describes a system that simultaneously acquires emission and transmission data using a CZT detector, Carroll describes a system including a tabletop laser and a linear accelerator with a photocathode injector and RF accelerator and gun and a beam alignment sub-system positioned at a laser beam-electron beam interaction zone that directs the X-ray beam through a beryllium window and onto mosaic crystals, Wintermark describes using perfusion CT for quantitative assessment of cerebral blood flow (CBF), mean transit time (MMT) and cerebral blood volume (CBV) of brain tissue, and Leuchter describes determining brain lesions by quantified electroencephalography.. Accordingly, for at least the reasons set forth above, Claim 23 is submitted to be patentable over Paulus in view of Carroll in view of Wintermark, and further in view of Leuchter.

Claim 26 depends from independent Claim 23. When the recitations of Claim 26 are considered in combination with the recitations of Claim 23, Applicants submit that dependent Claim 26 likewise is patentable over Paulus in view of Carroll in view of Wintermark, and further in view of Leuchter.

For the reasons set forth above, Applicants request that the Section 103 rejection of Claim 25 be withdrawn.

In view of the foregoing remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully requested.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read 'William J. Zychlewicz', written over a horizontal line.

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